

Discovery of *Noturus eleutherus*, *Noturus stigmosus*, and *Percina peltata* in West Virginia, with Discussions of Other Additions and Records of Fishes

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ABSTRACT.— Reports on several West Virginia fishes regarded as part of the state's ichthyofauna or known to inhabit certain drainages are ambiguous. Much of the information is unverifiable, unpublished, or erroneous, and makes preparation of state faunal and endangered species lists problematic. This paper discusses the addition of *Alosa sapidissima*, *Oncorhynchus nerka*, *Ctenopharyngodon idella*, *Notropis e. emiliae*, *Rhinichthys bowersi*, *Noturus eleutherus*, *N. stigmosus*, *Lepomis microlophus*, *Cycleptus elongatus*, *Percina gymnocephala*, *P. p. peltata*, *P. shumardi*, *Cottus cognatus*, and *C. girardi* to the state checklist. Problem data are also qualified for *Ichthyomyzon unicuspis*, *Lampetra appendix*, *Hybognathus nuchalis*, *Notropis dorsalis*, *Minytrema melanops*, *Noturus gyrinus*, *Etheostoma m. maculatum*, and *E. tippecanoe*. Verifiable or reliable records are documented for all the fishes concerned.

West Virginia waters, which include drainages from both sides of the Appalachian divide, contain a fairly unique and diverse ichthyofauna (Denoncourt et al. 1975). Although often analyzed as part of several drainages (Denoncourt et al. 1975, Jenkins et al. 1972, Stauffer et al. 1982), the fishes are most easily discussed as constituents of four distinct river systems (Miles 1971, Cincotta and Miles 1982). These are the Potomac and James rivers of the Atlantic slope, and the greater Ohio and New rivers of the Mississippi basin. The New River, technically the upper Kanawha River (Ohio River drainage), is usually regarded as a separate drainage because of its unique faunal assemblage (Addair 1944, Jenkins et al. 1972, Stauffer et al. 1982).

Historically, literature pertaining to the fishes of the state was meager and not readily available. The basis for information was dependent on the surveys of Osburn (1901), Goldsborough and Clark

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(1908), and Addair (1944). Raney (1947) and Raney and Seaman (1950, cited in Denoncourt et al. 1975) consolidated West Virginia fishery data by discussing the known and expected fauna based on the literature, numerous collections by the West Virginia Conservation Commission, personal sampling, unpublished information, and museum specimens (particularly the re-examination of Goldsborough and Clark's materials). These two checklists, which were designed as the basis for a Conservation Commission sponsored book dedicated to the state ichthyofauna (E. A. Seaman, pers. comm.; Anon. 1947), remained internal documents and were not widely disseminated. Unfortunately, the proposed publication was not completed.

Subsequent to E. C. Raney and E. A. Seaman's efforts and prior to 1970, numerous surveys were conducted in the state. The majority were performed by the Conservation Commission (e.g., W.Va. Wildl. Resour. Div. unpubl. records, Van Meter 1952, Menendez and Robinson 1964, Ross and Lewis 1969) and by F. J. Schwartz (e.g., *in* Core 1959; Schwartz 1958a, 1959, 1962, 1967). However, most of these data were unverifiable or unpublished. Following this period, several species were added to state faunal and drainage checklists (Miles 1971; Jenkins et al. 1972; Denoncourt et al. 1975; Stauffer et al. 1978, 1982), but were usually reported in an ambiguous manner. Although the works of Hambrick et al. (1973), Hocutt et al. (1978, 1979; *in* review), Stauffer et al. (1975, 1980; *in* press), Hardman et al. (1981), and Cincotta and Hoelt (in press) and certain systematic species reviews (e.g., Denoncourt 1969, Gilbert 1969, Jenkins 1970) clarify much data, distributional information is lacking for several species and drainages.

The purpose of this paper is to add fourteen species to the state faunal list and to clarify several ambiguous fish records. These data were compiled primarily during the preparation of Cincotta and Miles (1982, i.e., revision of Miles 1971), thus reference to this document is omitted.

MATERIALS AND METHODS

The following species accounts are based on verifiable or reliable data. Confirmation of ambiguous data for discussed species was made via literature review, personal communications with regional investigators, inspection of museum specimens, and examination of unpublished records of the West Virginia Department of Natural Resources, Wildlife Resources Division (WVWR; formerly the Conservation Commission, Fisheries Management Division). Materials from Cornell University (CU), Kentucky Department of Fish and Wildlife Resources (KFW), University of Louisville (UL), University of Michigan Museum of Zoology (UMMZ), Ohio State University (OSU), and National Museum of

Natural History (USNM) were used. Data regarding WVWR records and their deposition in the Department of Natural Resources fish museum at Elkins, are summarized in Table 1. Common and scientific names are from Robins et al. (1980).

ADDITIONS TO WEST VIRGINIA CHECKLIST

The following accounts discuss the addition of fourteen species to the West Virginia ichthyofauna, based on the checklist of Denoncourt et al. (1975). These additions are the result of recent collecting (*Noturus eleutherus*, *Noturus stigmosus*, *Lepomis microlophus*, *Percina peltata*, *Percina shumardi*), recent introduction (*Ctenopharyngodon idella*), data oversights (*Alosa sapidissima*, *Oncorhynchus nerka*, *Notropis emiliae*, *Cycleptus elongatus*, *Cottus cognatus*), description (*Percina gymnocephala*), and resurrection (*Rhinichthys bowersi*, *Cottus girardi*). Each species discussion is arranged in the order of listing in Robins et al. (1980), with emphasis given to those species collected by WVWR personnel (Table 1).

The data presented herein, combined with the addition of *Ammocrypta asprella* (Cincotta and Hoeft, in press) and the deletion of *Percina phoxocephala* (Hendricks et al. 1979; Thompson 1980; Stauffer et al., in press) and *Noturus gyrinus* (discussed in next section), increase the total number of West Virginia species to 164. It should be noted, however, that first West Virginia occurrence records reported by Pearson and Krumholz (1984) for *Lepisosteus platostomus*, *Notropis boops*, *N. heterolepis*, *Erimyzon sucetta*, *Fundulus notatus*, and *Etheostoma spectabile* were not treated here. These unverified data (W. D. Pearson, pers. comm.) are suspect, based on the information of Trautman (1981), Cooper (1983), and WVWR (unpubl. records). Attempts to verify much of this information by one of the authors (DAC) resulted in either re-determinations of incorrectly identified fishes or the inability to acquire voucher specimens.

Alosa sapidissima (Wilson), American shad

This anadromous clupeid is indigenous to Atlantic slope drainages of Canada and the United States (Burgess 1980). It was not reported as part of West Virginia's fauna by Goldsborough and Clark (1908), Raney (1947), Miles (1971), or Denoncourt et al. (1975). Although this shad is native to the lower Potomac River, it was introduced to the upper part (West Virginia and Maryland) of the drainage by the U.S. Fish Commission around the turn of the century (Kinney 1963). Omission of this species in past state checklists is attributed to either literature oversight or unsuccessful transplantation.

Oncorhynchus nerka (Walbaum), sockeye salmon

In North America, this species is native to Pacific slope drainages

Table 1. Summary of verifiable records for various West Virginia fish species collected by the West Virginia Department of Natural Resources, Wildlife Resources Division (WVWR).

| Species | WVWR Cat. No. | Date | N | Location (Collector) |
|-------------------------------|------------------|--------------|----|--|
| <i>Ichthyomyzon unicuspis</i> | 113 | 28 Sept 1979 | 2 | Ohio River at Gallipolis, Lock and Dam, near Henderson, Mason Co. (R. Miles, R. Preston) |
| | 132 | 2 Oct 1980 | 1 | Same as above |
| | 153 | 10 Nov 1980 | 1 | Ohio River at mouth Big Sandy River, Wayne Co. (M. Hoft, C. Doerfer) |
| | 228 | 1 Oct 1980 | 1 | Ohio River at Racine Lock and Dam near New Haven, Mason Co. (R. Miles, R. Preston) |
| | 390 | 15 Oct 1981 | 1 | Ohio River adjacent 6th Street Bridge at Huntington, Cabell Co. (M. Hoft, C. Doerfer) |
| <i>Lampetra appendix</i> | 83 | 14 Apr 1977 | 1 | Middle Island Creek at mouth Muddy Creek, Tyler Co. (R. Miles) |
| | 388 | 6 Apr 1978 | 4 | Middle Island Creek 8 km below confluence Muddy Creek, Tyler Co. (B. Dowler) |
| <i>Rhinichthys bowersi</i> | 350 | 29 Sept 1980 | 2 | 19.3 km above confluence Monongahelia River, Monongalia/Marion Co. line (F. Jernejcic, D. Courtney). |
| <i>Minytrema melanops</i> | 29 | 20 Sept 1976 | 5 | Turkey Run at confluence Ohio River, Jackson Co. (B. Dowler, R. Miles) |
| | 43 | 13 Sept 1977 | 15 | Lee Creek 0.8 km above confluence Ohio River, Wood Co. (B. Dowler) |
| | 50 | 3 Oct 1977 | 1 | Tombleson Run 0.2 km above confluence Ohio River adjacent State Rt. 33, Mason Co. (S. Muth) |
| | 87 | 20 Sept 1978 | 1 | Ohio River at Hannibal Locks and Dam at New Martinsville, Wetzel Co. (R. Miles, R. Preston) |

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|--------------------------------|-----|--------------|----|---|
| <i>Noturus eleutherus</i> | 135 | 20 Apr 1979 | 1 | Elk River at mouth King Shoals Run, Kanawha Co. (R. Miles, B. Pierce) |
| | 278 | 16 Nov 1982 | 1 | Elk River at mouth Jordan Creek near Falling Rock, Kanawha Co. (M. Hoeft, D. Cincotta, T. Oldham) |
| <i>Noturus stigmatosus</i> | 27 | 22 Sept 1976 | 2 | Kanawha River at London Lock and Dam at London, Kanawha Co. (R. Miles, R. Preston) |
| | 48 | 29 Sept 1977 | 1 | Same as above |
| | 336 | 7 Oct 1980 | 3 | 2.4 km below Matewan at railroad tunnel, Mingo Co. (M. Hoeft, F. Jernejcic, B. Dowler, D. Cincotta) |
| | 352 | 5 Oct 1981 | 1 | Kanawha River at London Lock and Dam at London, Kanawha Co. (M. Hoeft, D. Cincotta, T. Oldham) |
| <i>Etheostoma m. maculatum</i> | 85 | 12 Oct 1978 | 3 | Elk River 3.2 km above Bear Run, Webster Co. (R. Miles, B. Pierce) |
| | 9 | 9 July 1976 | 28 | Little Kanawha River at Newark, Wirt Co. (R. Miles) |
| <i>Etheostoma tippicanoe</i> | 10 | 9 July 1976 | 12 | Little Kanawha River at Sanoma low water bridge, Wirt Co. (R. Miles) |
| | 11 | 9 July 1976 | 21 | Little Kanawha River at mouth Nettle Run near Burning Spring, Wirt Co. (R. Miles) |
| | 12 | 9 July 1976 | 18 | Little Kanawha River at State Rt. 5 bridge, 1.9 km above Annamoriah, Calhoun Co. (R. Miles) |
| | 13 | 6 Aug 1976 | 3 | Little Kanawha River at Hattie, 1.5 km below Calhoun/Gilmer Co. line, Calhoun Co. (R. Miles) |
| | 14 | 6 Aug 1976 | 9 | Little Kanawha River 2.4 km above Big Bend at mouth Big Root Run, Calhoun Co. (R. Miles) |
| | 278 | 16 Nov 1982 | 31 | Elk River at mouth Jordan Creek near Falling Rock, Kanawha Co. (M. Hoeft, D. Cincotta, T. Oldham) |
| <i>Percina gymnocephala</i> | 67 | 9 Aug 1977 | 2 | Williams River of Gauley River 1.6 km below Webster Co. line (D. Phares) |

Table 1. (Continued)

| Species | WVWR Cat. No. | Date | N | Location (Collector) |
|---------------------------|------------------|--------------|----|---|
| | 70 | 8 Aug 1977 | 1 | Williams River of Gauley River, 0.2 km above State Rt. 17/4 bridge, Pocahontas Co. (D. Phares, R. Menendez) |
| | 108 | 20 July 1978 | 3 | Big Laurel Creek of Cherry River (Gauley River), 1.2 km above Jettsville, Greenbrier Co. (D. Phares, J. Reed) |
| | 156 | 22 Aug 1978 | 1 | West Fork Greenbrier River (New River) 18.8 km above mouth, Pocahontas Co. (D. Phares, T. Oldham) |
| <i>Percina p. peltata</i> | 398 | 15 July 1977 | 1 | Shenandoah River at Millville, 8 km above confluence Potomac River, Jefferson Co. (G. Lewis) |
| <i>Percina shumardi</i> | 367 | 14 Oct 1980 | 1 | Tomblason Run 0.2 km above confluence Ohio River adjacent State Rt. 33, Mason Co. (M. Hoefl, C. Doerfer) |
| <i>Cottus cognatus</i> | 257 | 19 Aug 1975 | 10 | Rocky Marsh Run 1.6 km N of State Rt. 45 or 4.8 km above confluence Potomac River, Berkeley/Jefferson Co. line (G. Lewis) |
| | 256 | 8 June 1981 | 11 | Turkey Run of Opequon Creek 0.2 km above Middleway, Jefferson Co. (G. Lewis) |
| <i>Cottus girardi</i> | 345 | 18 Aug 1981 | 1 | North Fork South Branch Potomac River 0.8 km above Grant Co. line, Pendleton Co. (D. Phares, T. Oldham, C. Heartwell) |
| | 499 | 22 Aug 1983 | 2 | Mill Creek of Patterson Creek 5 km west of Burlington at State Rt. 50 and 220 bridge, Mineral Co. (T. Oldham, D. Phares) |

and has been stocked in numerous locations within the United States (Lee and Shute 1980). Although Kinney (1963) reported that "California and Pacific salmon" (species unknown) were stocked in the late 1800s in West Virginia waters (along with *Alosa sapidissima*), no salmon species have ever been included on past state ichthyofaunal checklists. Schwartz (in Jenkins et al. 1972), however, ambiguously indicated *O. nerka* in the Monongahela River drainage; this information is probably based on his Cheat River, West Virginia, record reported in Core (1959). During the 1950s the landlocked form of this species, the kokanee, was stocked by the WVWR in the Potomac (Stoney River Reservoir, Grant County; Cacapon Lake, Morgan County; Trout Pond, Hardy County), Monongahela (Spruce Knob Lake, Tucker County), and New (Watoga Lake, Pocahontas County) river drainages (Van Meter 1953). These records have probably been omitted from the state lists due to literature oversight or failure of the introductions.

Ctenopharyngodon idella Valenciennes, grass carp

This species, a native of China, has been introduced throughout the United States for aquatic vegetation control (Guillory 1980). Guillory gave two unconfirmed Kanawha River drainage records. WVWR Division personnel have verified the occurrence of this species in a Nicholas County pond, Gauley River drainage (B. F. Dowler, pers. comm.). Furthermore, some of the specimens from this introduction have supposedly been transferred to a pond in Wirt County, Little Kanawha River drainage. To date, there are no records of this species from lotic environments in the state.

Notropis emiliae emiliae (Hay), pugnose minnow

Gilbert and Bailey (1972) transferred this species from the monotypic genus *Oposopoeodus* to *Notropis* and recognized the subspecies *N. e. emiliae* and *N. e. peninsularis*. The latter form is endemic to the Florida peninsula, while the former is found in Lake Erie, Mississippi, and southern Atlantic slope and Gulf coast drainages. Trautman (1981) noted three lower Muskingum River records collected between 1901 and 1938 a few kilometers from the Ohio River, West Virginia (i.e., main channel). He further indicated that, since the species had not been recently collected from this area, it had been extirpated. Apparently, two records for this species have been overlooked in past reviews of the state fauna, as it is not included in previous publications. It was collected from Big Run, Wood County, in 1949 (Gilbert and Bailey 1972; CU 21054), and from Oldtown Creek, Mason County, in 1958 (UL 10523, unpubl. data of Krumholz et al. 1962; W. D. Pearson, pers. comm.). These data indicate the presence of this species in the upper Ohio River subsequent to the period discussed by Trautman (1981), and support his contention that it once was more widespread and common.

Notropis e. emiliae is either extirpated or extremely rare in the upper Ohio River, as there are no recent published records from West Virginia or Ohio.

Rhinichthys bowersi Goldsborough and Clark, Cheat minnow

This controversial form was originally described as a species by Goldsborough and Clark (1908), but was subsequently identified as a *Nocomis micropogon* x *Rhinichthys cataractae* hybrid by Raney (1940). The distribution of this minnow appears restricted to Lake Erie and Monongahela River drainages (Hendricks et al. 1979; Stauffer et al. 1979). Although Stauffer et al. (1979) indicated that this form qualified morphometrically and meristically as a species, they could not conclusively decide its validity. Recent electrophoretic data indicate it is a true species (Goodfellow et al. 1984). In West Virginia, *R. bowersi* is rare to common in the eastern Monongahela River tributaries (Stauffer et al. 1979; Goodfellow et al. 1984). WVWR personnel recently collected two specimens from Whiteday Creek (Marion/Monongalia County; WVWR 350), which represents only the second time this minnow has been taken from western tributaries of the Monongahela River. C. H. Hocutt (pers. comm.) indicated that *R. bowersi* would be petitioned under provisions of the Endangered Species Act of 1973 as a threatened species.

Cycleptus elongatus (Lesueur), blue sucker

This sucker is usually found in the larger rivers of the Mississippi and Gulf slope drainages (Gilbert 1980a). In West Virginia, Trautman (1981) reported it in the main channel Ohio River. However, probably due to an absence of verifiable historical records (J. R. Stauffer, pers. comm.), Denoncourt et al. (1975) did not include the species on their state checklist. The authors, as did Pearson and Krumholz (1984), accepted the data of Trautman and recognize the species as part of the West Virginia ichthyofauna. Although this sucker has not been taken in numerous surveys in recent years on the West Virginia portion of the Ohio River (Trautman 1981, Preston and White 1978, WVWR unpubl. data), Trautman (1981) reported two records in Ohio near West Virginia. Additionally, a specimen may have been captured (unconfirmed) from the Ohio River adjacent to Hancock County, West Virginia, in 1981 (Pearson and Krumholz 1984). These records are possibly attributable to migrating fish from the lower river where the population is improving (W. L. Davis, pers. comm.; Pearson and Krumholz 1984).

Noturus eleutherus Jordan, mountain madtom

The mountain madtom is found sporadically in southcentral Mississippi River drainages within Oklahoma, Arkansas, and Missouri, and throughout the Ohio River to Pennsylvania (Taylor 1969, Rohde 1980b). In the vicinity of West Virginia, this madtom is known from the Levisa Fork of the Big Sandy River in Kentucky (Jenkins et al. 1972, Rohde

1980b, Stauffer et al. 1982, and from tributaries immediately adjacent the main channel Ohio River in Ohio (Trautman 1981). The mountain madtom may have been collected by Krumholz et al. (1962) from the main channel Ohio River of West Virginia, but the specimens assigned UL 11461 and 11617 are missing (W. D. Pearson, pers. comm.). On 20 April 1978 and 16 November 1982, the species was collected from two locations in lower Elk River (Kanawha River drainage) during seining surveys (WVWR 135 verified by Hocutt, 278 by Jenkins). These WVWR records represent the first verifiable evidence of *N. eleutherus* in the state, and a distributional record for the lower Kanawha River.

On each occasion, the mountain madtom was taken in swift riffles (ca. 50 cm depth) containing medium to large rubble. The river was ca. 30 m wide at both sites. Species associates common to both localities were: *Etheostoma blennioides*, *E. camurum*, *E. tippecanoe*, *E. variatum*, *E. zonale*, *Percina copelandi*, and *P. macrocephala*. Absence of *N. eleutherus* in past surveys is attributed to a lack of sampling in large rivers and their major tributaries.

Noturus stigmosus Taylor, northern madtom

Rohde (1980a) gave this madtom's range as tributaries of the Mississippi River from the western margin of Tennessee, northeastward throughout much of the Ohio River basin to the western edge of Pennsylvania; it also occurs within the western Lake Erie drainages in Ohio, Indiana, and Missouri. Relative to West Virginia, Clay (1975; KFW 1221) and Burr (1980) reported this species from the Levisa Fork of the Big Sandy River in Kentucky, Trautman (1981) reported it from the lower Muskingum River and a minor tributary near the main channel Ohio River in Ohio, and Cooper (1983) reported it from certain tributaries of the Allegheny River drainage in Pennsylvania. Denoncourt et al. (1975) expected it to occur within West Virginia waters. The following data represent the first verification of the species in West Virginia (C. H. Hocutt, pers. comm.; Stauffer et al. 1982). Paucity of surveys from large rivers probably explains its exclusion from previous collections.

In 1976, 1977, and 1981 *N. stigmosus* was taken from the Kanawha River at London, West Virginia, during lock rotenone surveys (WVWR 27, 48, 352; first two verified by Hocutt). In addition, two specimens were collected from the same area in 1977 by Virginia Polytechnic Institute personnel (C. H. Hocutt, pers. comm.). On 7 October 1980 the fifth collection of this species occurred in Tug Fork River (Big Sandy drainage) during a rotenone survey near Matewan, Mingo County, West Virginia (WVWR 361). Species common to all WVWR samples were: *Notropis volucellus*, *Moxostoma anisurum*, *M. macrolepidotum*, *Ictalurus punctatus*, *Noturus flavus*, *Pylodictis olivaris*, *Micropterus punctulatus*, and *Percina caprodes*.

Taylor (1969) and Rohde (1980a) reported that in the Ohio River drainage *N. stigmatosus* prefers large creeks and rivers with bottoms of shifting sand and mud, and water varying from clear to turbid with moderate current. The 0.85 ha habitat sampled in the Tug Fork consisted primarily of riffles with boulders (30%) and rubble (70%) and a long pool of primarily sand bottom. The water was turbid, and flows in the 30.48-m-wide channel were 4.8 to 5.9 cm/second. Water quality parameters recorded with a Hach kit at the time of the sampling were: pH (7.6), Fe (.18 mg/l), alkalinity (160 mg/l as CaCO₃), conductivity (68 micromhos/cm), and water temperature (14.4 °C). This area of the river is known to experience repeated load violations regarding organic suspended solids (i.e., domestic sewage) and iron (Steele and McCoy 1980).

Lepomis microlophus (Günther), redear sunfish

Lee (1980) considered this species native to the Mississippi, southern Atlantic slope, and Gulf slope drainages from Florida to Texas. In the immediate vicinity of West Virginia, the redear sunfish was collected from the main channel Ohio River and the Big Sandy River in Kentucky (Clay 1975, Burr 1980, Lee 1980), and the Monongahela River in Pennsylvania (Jenkins et al. 1972, Lee 1980, Stauffer et al. 1982). Denoncourt et al. (1975) listed the redear sunfish as expected, but Miles (1971) regarded it as present in West Virginia based on WVWR records (Anon. 1950, Menendez and Robinson 1964). Other evidence supporting its existence in the state comes from the Ohio River sampling summary of Preston and White (1978; some *L. microlophus* specimens verified by M. L. Trautman, pers. comm.) and Trautman (1981). These authors found the species generally infrequent in its introduced range in the upper Ohio River.

Percina gymnocephala Beckham, Appalachia darter

This endemic upper Kanawha River species was recently described by Beckham (1980). He discussed its relationship to *P. maculata* and *P. peltata*. The Appalachia darter appears to be more closely aligned with *P. peltata*, which is confined to Atlantic slope drainages. *Percina gymnocephala* has been recently collected in West Virginia by Hocutt et al. (1978, 1979; in review), Stauffer et al. (1975, 1980), and WVWR (67, 70, 108, 156). These data indicate the species is widely distributed throughout the upper Kanawha River system in West Virginia, but is usually not abundant.

Percina peltata peltata (Stauffer), shield darter

This darter is known to inhabit streams of the Atlantic slope from New York to North Carolina (Malick 1980). Geographic variation in the species was reported in Raney and Suttkus (1948) as *P. p. peltata*

from the James River, Virginia, to Hudson River, New York; as *P. peltata nevisense* from the Neuse and Tar rivers, North Carolina; and as *P. p.* subsp. from the upper Roanoke River. This percid was expected to occur in the West Virginia part of the Potomac and James rivers by Raney (1947) and Denoncourt et al. (1975). Stauffer et al. (1978) indicated that it was not known in the upper Potomac River west of the Blue Ridge divide. On 15 July 1977 a single specimen of the shield darter was collected from the Shenandoah River, West Virginia, during a boat electrofishing survey (WVWR 398, verified by Jenkins). This capture represents an upstream distribution record, and an addition to the Shenandoah River (R. E. Jenkins, pers. comm.) and West Virginia fauna. Other species taken concurrently were: *Anguilla rostrata*, *Cyprinus carpio*, *Catostomus commersoni*, *Hypentelium nigricans*, *Moxostoma* sp., *Ictalurus punctatus*, *Lepomis auritus*, *L. gibbosus*, *L. macrochirus*, *Micropterus dolomieu*, and *M. salmoides*. The inability of past investigators to collect *P. p. peltata* in the Potomac River, West Virginia, suggests that it is either extremely rare or restricted to large-river habitat.

Percina shumardi (Girard), river darter

Gilbert (1980b) indicated that the river darter is broadly distributed throughout the Gulf slope, Mississippi basin, Lake Huron, Lake Erie, and Hudson Bay drainages of North America. It is sporadically distributed and rare in the Ohio River basin, especially in the middle and upper reaches of the main channel (Trautman 1981, Clay 1975, Smith 1979, Burr 1980). Trautman (1957) reported it from only a few Ohio localities in the Ohio River drainage. He indicated it was definitely known from the Ohio River proper before 1900, and depicted three records (two in West Virginia) from this period. No new records in West Virginia were noted by Trautman (1981). Although Miles (1971) listed the species as known in the state, Raney (1947) and Denoncourt et al. (1975) reported it as an expected species (probably due to the absence of verifiable specimens). On 14 October 1980, one specimen of the river darter was found in a rotenone sample of an Ohio River backwater area (WVWR 367, verified by R. M. Bailey). This record represents the first report in over 80 years of *P. shumardi* in the Ohio River, West Virginia. In 1981 another individual was collected from the Ohio River adjacent to Mason County, West Virginia, by personnel of Geo-Marine Inc. (J. A. Pfeiffer, pers. comm.; specimen verified by Pearson).

Cottus cognatus Richardson, slimy sculpin

This sculpin is broadly distributed in Canada and the northern United States. It is found in certain drainages west of the Rocky Mountains, the Great Lakes basin, and the north and central Atlantic slope

(Wallace et al. 1980). Its southeastern range limit is the Potomac-Shenandoah drainage (R. E. Jenkins, pers. comm.), and the taxonomic status of this Potomac River population is uncertain. Strauss (1980) said that the Potomac River population represents an undescribed endemic species, genetically similar to *Cottus girardi* but morphometrically similar to *C. bairdi*. However, Jenkins (pers. comm.) indicates it may only be a subspecies of *cognatus*. For the purpose of this paper, the Potomac River population is recognized as *Cottus cognatus*.

Until 1975, the slimy sculpin was regarded as part of the West Virginia fauna by Raney (1947), Hubbs and Lagler (1958), and Miles (1971). Denoncourt et al. (1975) altered the occurrence status to anticipated because of the absence of verifiable specimens (J. R. Stauffer, pers. comm.). The only published West Virginia record of this cottid was recently reported ambiguously by Wallace et al. (1980). This information, which may be in error (R. L. Wallace, pers. comm.), is probably based on a missing UMMZ collection (75426) taken from South Branch Potomac River in 1939. Apparently the first records of this species in West Virginia were overlooked, as in 1909 E. L. Goldsborough collected it from two locations in the Opequon Creek drainage of the Potomac River, Berkeley County (USNM 64591, 64593; R. E. Strauss, pers. comm.). The only other records of this fish in the state were taken in 1975 and 1981 by WVWR personnel from two streams in Jefferson County, West Virginia (WVWR 256, 257, verified by Jenkins). Species common to both locations were *Rhinichthys atratulus*, *Semotilus margarita*, and *Catostomus commersoni*. Absence of *C. cognatus* from numerous past collections in the West Virginia part of the Potomac River suggests a sparse distribution or confusion with *Cottus bairdi* or *C. girardi*.

Cottus girardi Robins, Potomac sculpin

This species is currently known only from the Potomac, James, and Susquehanna river drainages of the Atlantic slope (Strauss 1977). Although originally described and aligned to the *carolinae* species group by Robins (1961), Savage (1962) considered it synonymous with *Cottus bairdi*. Its taxonomic status remained controversial (Jenkins et al. 1972, Mathews et al. 1978, Stauffer et al. 1978) until resurrected by Strauss (1977) and Mathews (1980). It may be fairly common in the upper Potomac River tributaries as suggested by data of Mathews et al. (1978), Jenkins et al. (1980), Goodfellow and Lebo (1981), and Cincotta et al. (ms.). The WVWR has only two verifiable records of this species to date (WVWR 345, 499, former verified by Jenkins).

AMBIGUOUS RECORDS

The first attempt to document fishes of West Virginia was made by Goldsborough and Clark (1908), but most of their data were collected

from small waters. It was not until the extensive Kanawha River work of Addair (1944) and the annotated checklist of Raney (1947) that the occurrence and distribution of many species was generally understood. Although the recent drainage surveys by Hocutt et al. (1978, 1979; in review), Stauffer et al. (1975, 1980; in press), and Hardman et al. (1981) resulted in significant contributions in this regard, information relative to several species is lacking. Investigators have encountered difficulty in preparing state nongame or "endangered species" documents because much information relative to West Virginia's ichthyofauna is ambiguous, unverifiable, and/or unpublished. This section discusses the status of several species that are uncommon either statewide or in a particular drainage. New information collected by WVWR is noted (Table 1).

Ichthyomyzon unicuspis Hubbs and Trautman, silver lamprey

This parasitic lamprey is found in the Mississippi basin, primarily from Tennessee northward to the Great Lakes, St. Lawrence and Hudson Bay drainages (Rohde and Lanteigne-Courchene 1980). It was not reported from West Virginia drainages by Raney (1947), Schwartz (1958b), Jenkins et al. (1972), or Stauffer et al. (1982); but Miles (1971), Denoncourt et al. (1975), and Stauffer (pers. comm.) considered it native on the basis of unpublished WVWR records. The earliest West Virginia record for the silver lamprey was that reported from the main channel Ohio River by Trautman (1957, OSU 11657). This record appears to have been overlooked by past investigators, probably due to the nearness of the site to the boundaries of Kentucky, Ohio, and West Virginia. Verifiable specimens have since been taken from four Ohio River locations (WVWR 113, 132, 153, 228, 390). These data suggest that the silver lamprey population in the upper Ohio River is increasing, rather than decreasing as theorized by Trautman (1981).

Lampetra appendix (DeKay), American brook lamprey

Lampetra appendix (= *lamottei*) is a nonparasitic lamprey of the subgenus *Lethenteron*. It is known from the Great Lakes and Atlantic slope drainages from Minnesota to Virginia, and throughout the middle and upper sections of the Mississippi River basin (Rohde 1980c). Raney (1947) reported this species in the state on the basis of the Monongahela River record of Gribble (1939). Rohde (1980c) did not show the American brook lamprey in West Virginia, but indicated occurrence in the Ohio River drainage of Kentucky, Ohio, Pennsylvania, and New York. The species was noted as native to only the Little Kanawha River by Jenkins et al. (1972) and Stauffer et al. (1982). Stauffer (pers. comm.) indicated that there are no confirmable specimens from state waters. WVWR personnel recently collected *L. appendix* from Middle Island Creek of the Ohio River drainage (WVWR 83, 388). The WVWR vouchers and an uncatalogued Little Kanawha River specimen at the

USNM (F. C. Rohde, pers. comm.) are the only verifiable records of this lamprey from West Virginia.

Hybognathus nuchalis Agassiz, Mississippi silvery minnow

Pflieger (1980) indicated that *H. nuchalis* contains three nominal subspecies of uncertain relationships that probably qualify for specific designations due to their morphological distinctiveness and allopatric ranges. The two forms whose ranges encompass West Virginia are *H. n. nuchalis*, of the Mississippi River and Mobile Bay drainages, and *H. n. regius*, of the Lake Ontario, St. Lawrence, and Atlantic slope drainages south to Altamaha River, Georgia (Pflieger 1980). Lee et al. (1980) and Robins et al. (1980) recognized the specific distinctiveness of *H. regius* (see Hubbs and Lagler 1958 for characters). To date, there are no published records of *Hybognathus regius* from West Virginia (C. H. Hocutt, pers. comm.; Pflieger 1980). *Hybognathus nuchalis* was apparently first collected from the state in 1888 from the mouth of the Big Sandy River, Wayne County (Everman 1918). Raney (1947) confirmed the only other silvery minnow record from the Monongahela River drainage, based on a specimen misidentified as *Notropis whipplei* by Goldsborough and Clark (1908). The exclusion of these records in Jenkins et al. (1972), Pflieger (1980), and Stauffer et al. (1978, 1982) is attributed to either oversight or absence of verifiable materials. Absence of *H. nuchalis* from recent collections from the upper Ohio River drainages (Preston and White 1978, Trautman 1981) and *H. regius* from the upper Potomac River drainages (Mathews et al. 1978; Stauffer et al. 1978; Goodfellow and Lebo 1981; Cincotta et al., in ms.) suggests that both are either rare in or extirpated from these waters. Trautman (1957) attributed the silvery minnow's extirpation from Ohio to turbidity and siltation.

Notropis dorsalis (Agassiz), bigmouth shiner

The bigmouth shiner is found primarily in the upper Mississippi and Great Lakes (excluding Lake Huron) drainages (Gilbert and Burgess 1980a). It is discontinuously distributed in the eastern part of its range. Prior to Gilbert and Burgess (1980a), only Schwartz (*in* Jenkins et al. 1972) and Denoncourt et al. (1975) indicated its presence in West Virginia. Schwartz regarded the species native to the Little Kanawha River, but a lack of verifiable specimens led C. R. Gilbert (pers. comm.) and Stauffer et al. (1982) to doubt this assumption. Gilbert and Burgess (1980a) indicated a single Monongahela River drainage record for West Virginia (UMMZ 198279, Tygart River, collected and identified by C. L. Hubbs and M. B. Trautman). Omission of this shiner from past literature on the Monongahela River is attributed to the obscurity of the record. *Notropis dorsalis* is probably extirpated from the state, as it has not been collected since 1932.

Minytrema melanops (Rafinesque), spotted sucker

This sucker is known from the lower Great Lakes (Erie, Huron and Michigan), throughout the Mississippi, and from the Gulf slope and southern Atlantic coastal basins (Gilbert and Burgess 1980b). Jenkins et al. (1972), Stauffer et al. (1978), and Hendricks et al. (1979) originally considered this species native to the Monogahela River drainage based on the Youghiogheny River record of Schwartz (1964), but the validity of this record is now questioned since no verifiable specimens exist (Gilbert and Burgess 1980b, Stauffer et al. 1982). The spotted sucker was confirmed in the West Virginia section of this basin by Raney (1947), based on a specimen misidentified as *Moxostoma macrolepidotum* by Goldsborough and Clark (1908). Although these data support the record of Schwartz (1964), *M. melanops* has not been recently collected from the Monongahela River drainage. This sucker is still common in other Ohio River drainages of West Virginia (e.g., WVWR 29, 43, 50, 87).

Noturus gyrinus (Mitchell), tadpole madtom

The tadpole madtom is found throughout the Mississippi, Gulf coast, and Atlantic slope (including Great Lakes) drainages of North America (Rohde 1980d). Although it is widely distributed in Ohio (Trautman 1981) and is reported in the lower Potomac and James rivers (Stauffer et al. 1982), this species has never been verified from West Virginia waters. Raney (1947) anticipated its occurrence in West Virginia, but Miles (1971) and Denoncourt et al. (1975) listed the species as part of the fauna. This madtom may have been collected from the main channel Ohio River of West Virginia by Krumholz et al. (1962), but no specimens are extant (W. D. Pearson, pers. comm.). The closest records of this species to West Virginia are those of Trautman (1981), only a few kilometers from the state border. Owing to the absence of confirmable records, C. H. Hocutt (pers. comm.) presently regards these species as expected to occur in the state.

Etheostoma maculatum maculatum Kirtland, spotted darter

Zorach and Raney (1967) reviewed the systematics and distribution of the three recognized subspecies that are restricted to the Ohio River drainage: *E. m. maculatum*, *E. m. sanguifluum*, and *E. m. vulneratum*. Etnier (1980) noted that the nominate form exhibited a disjunct distribution pattern in the Ohio River basin from New York to Kentucky. Schwartz (in Jenkins et al. 1972) reported *E. m. maculatum* from lower Kanawha River (below Kanawha Falls), but did not substantiate the record. Based on these unverifiable data the species was listed as part of West Virginia's fauna (Miles 1971, Denoncourt et al. 1975). In 1978, WVWR personnel collected three spotted darters in a rotenone sample

on the Elk River (Kanawha River drainage; WVWR 85). These specimens represent the only verifiable occurrence of this species from West Virginia (J. R. Stauffer, pers. comm.), and this record is depicted in the distributional review of Etnier (1980).

Etheostoma tippecanoe Jordan and Everman, Tippecanoe darter

This species is restricted to the Ohio River basin, where it is broadly but discontinuously distributed (Zorach 1969). It was first collected in West Virginia by WVWR personnel (unpubl. data, verified by Schwartz) in 1966 from Little Kanawha River and later in the same year by Schwartz from Elk River. Although these two unpublished records were overlooked by Zorach (1969), Schwartz ambiguously reported both in Jenkins et al. (1972). Hocutt (1980) depicted records for this percid in the state, but did not include detailed data. WVWR data (WVWR 9, 10, 11, 12, 13, 14, 278) suggest that the species, which is considered generally rare within its range (Kuehne and Barbour 1983), is common in the Little Kanawha and lower Elk rivers.

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